CALIFORNIA DEPARTMENT OF PUBLIC HEALTH
850 Marina Bay Parkway, Richmond, CA 94804

ENVIRONMENTAL MANAGEMENT BRANCH
Marine Biotoxin Monitoring Program

Monthly Marine Biotoxin Report

July 2015

Technical Report No. 15-17

INTRODUCTION:

This report provides a summary of biotoxin activity for the month of July, 2015. Ranges of toxin concentrations are provided for the paralytic shellfish poisoning (PSP) toxins and for domoic acid (DA). Estimates are also provided for the distribution and relative abundance of *Alexandrium*, the dinoflagellate that produces PSP toxins, and *Pseudo-nitzschia*, the diatom that produces domoic acid. Summary information is also provided for any quarantine or health advisory that was in effect during the reporting period.

Please note the following conventions for the phytoplankton and shellfish biotoxin distribution maps: (I) All estimates for phytoplankton relative abundance are qualitative, based on sampling effort and percent composition; (ii) All toxin data are for mussel samples, unless otherwise noted; (iii) All samples are assayed for PSP toxins; DA analyses are performed as needed (i.e., on the basis of detected blooms of the diatoms that produce DA); (iv) Please refer to the appropriate figure key for an explanation of the symbols used on the maps.

Southern California Summary:

Paralytic Shellfish Poisoning

Alexandrium was observed at sites in San Luis Obispo and Los Angeles counties in July (Figure 1). PSP toxins detected in the sentinel mussels at Cal Poly Pier increased over the alert level in July to 92 ug/100 g. Low levels of PSP toxins were detected in mussel samples at sites in San Luis Obispo, Santa Barbara,

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Figure 1. Distribution of toxin-producing phytoplankton in Southern California during July, 2015.

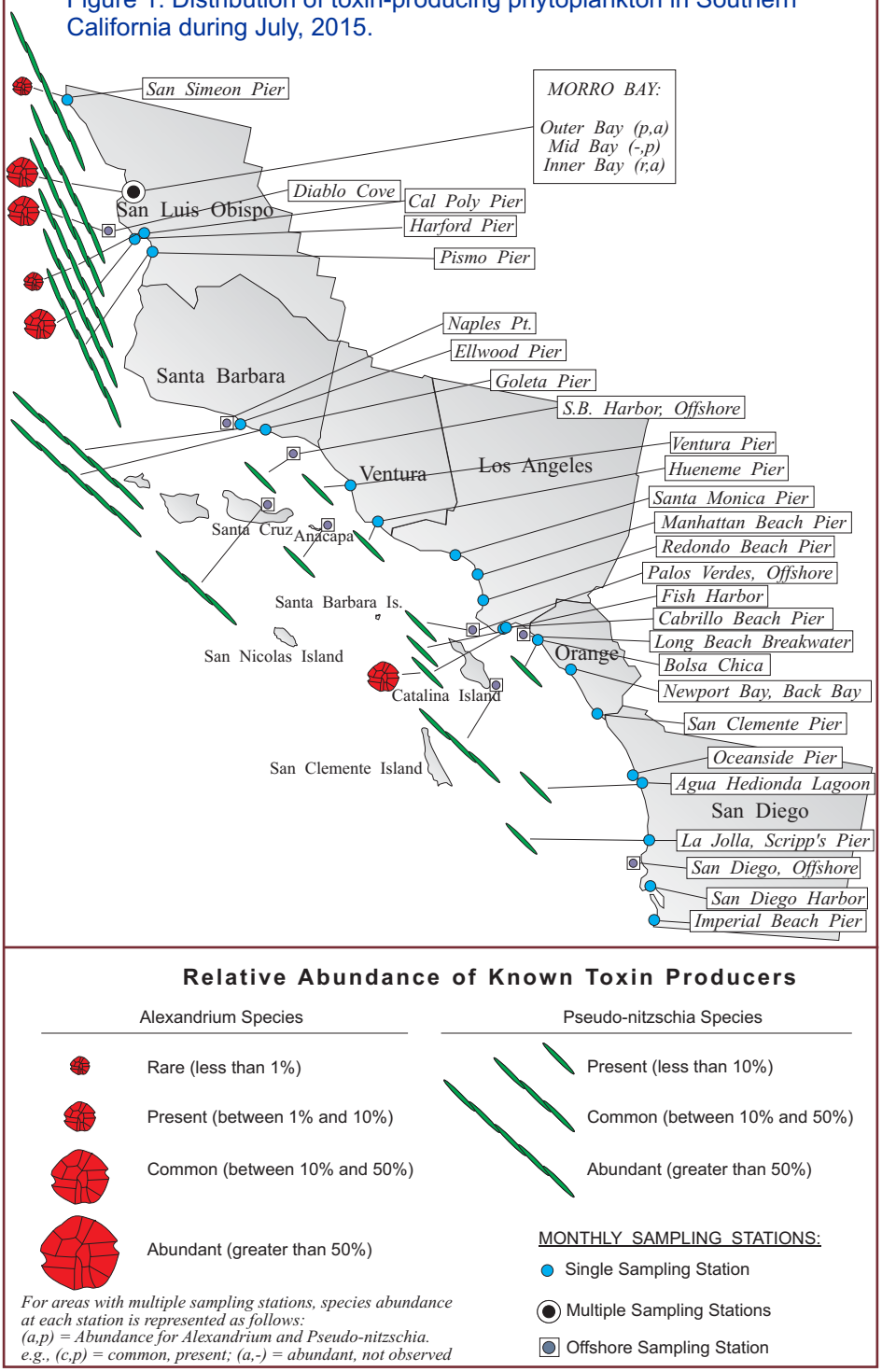
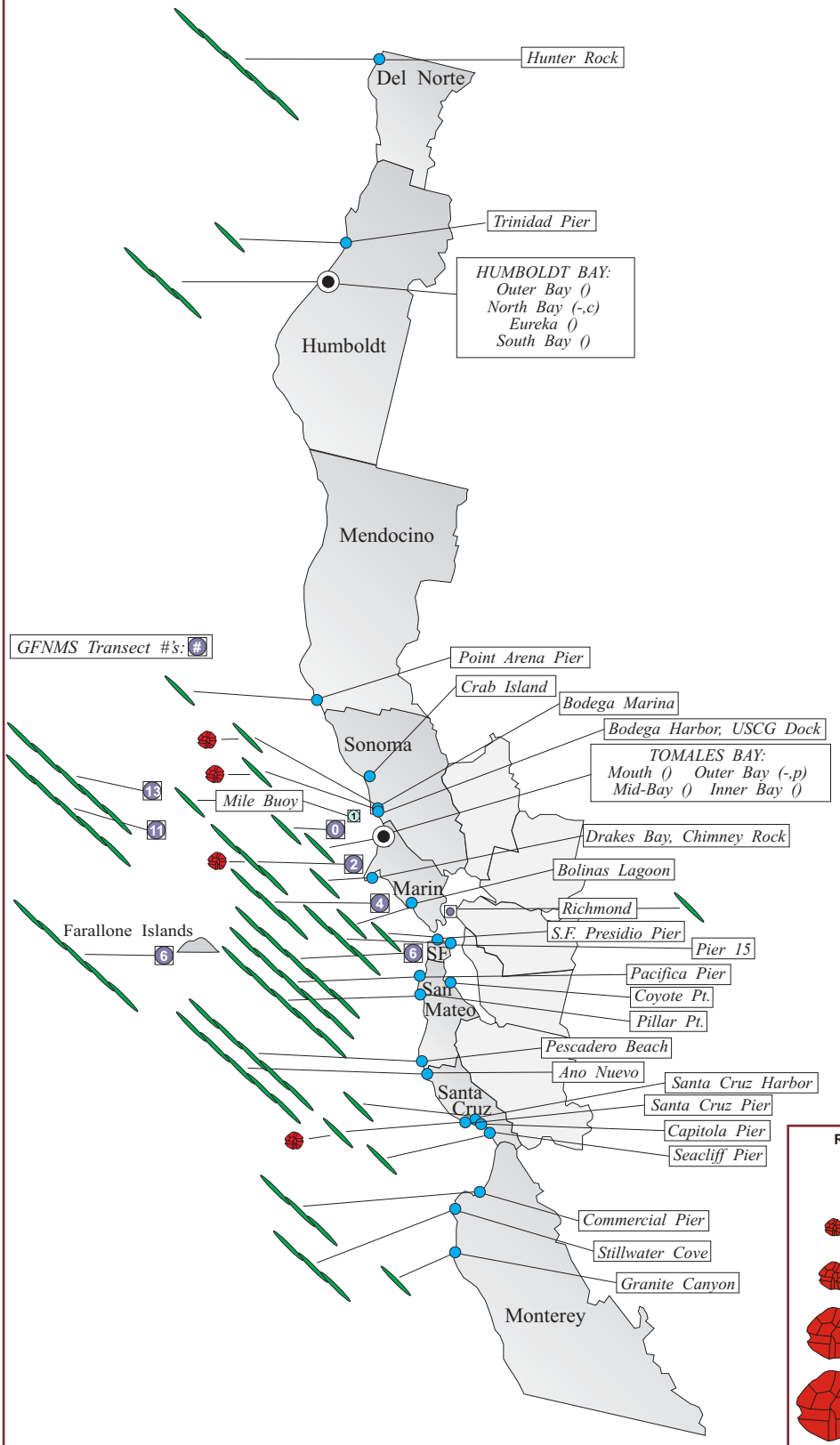


Figure 2. Distribution of toxin-producing phytoplankton in Northern California during July, 2015.



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and Los Angeles counties. PSP toxins below the alert level were detected in a rock scallop viscera sample from the Santa Barbara Channel during the second week of July (Figure 3).

Domoic Acid

Pseudo-nitzschia was observed at select sampling sites in all Southern California counties (Figure 1). The percent composition of this diatom increased at sites in San Luis Obispo County. The highest relative abundance was observed at Harford Pier (San Luis Obispo County) during the third week of July. The cell mass was low at most locations. Domoic acid was detected in samples from San Luis Obispo and Santa Barbara counties (Figure 3). Low concentrations of domoic acid were detected in shellfish samples from Morro Bay, Cal Poly Pier (San Luis Obispo County) and Goleta Pier (Santa Barbara County). CDPH Food and Drug Branch obtained crab samples caught offshore of the Northern Channel Islands during the third week of July. The crab viscera contained variable levels of domoic acid, with the highest concentration at 20 ppm.

Non-Toxic Species

The diatom *Chaetoceros* was common to abundant at sites from Santa Barbara to San Diego counties. The dinoflagellate *Ceratium furca* was common to abundant at select sites

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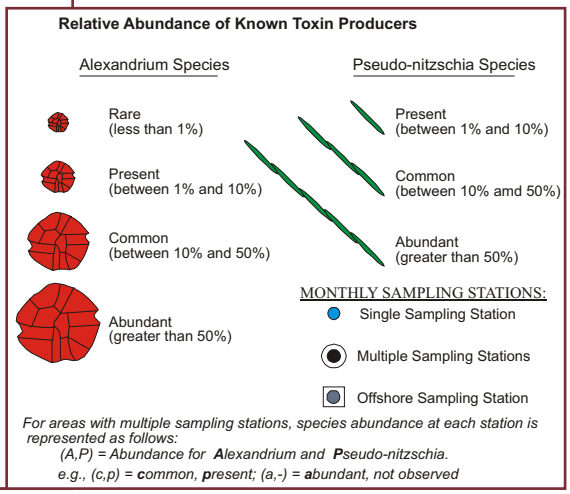

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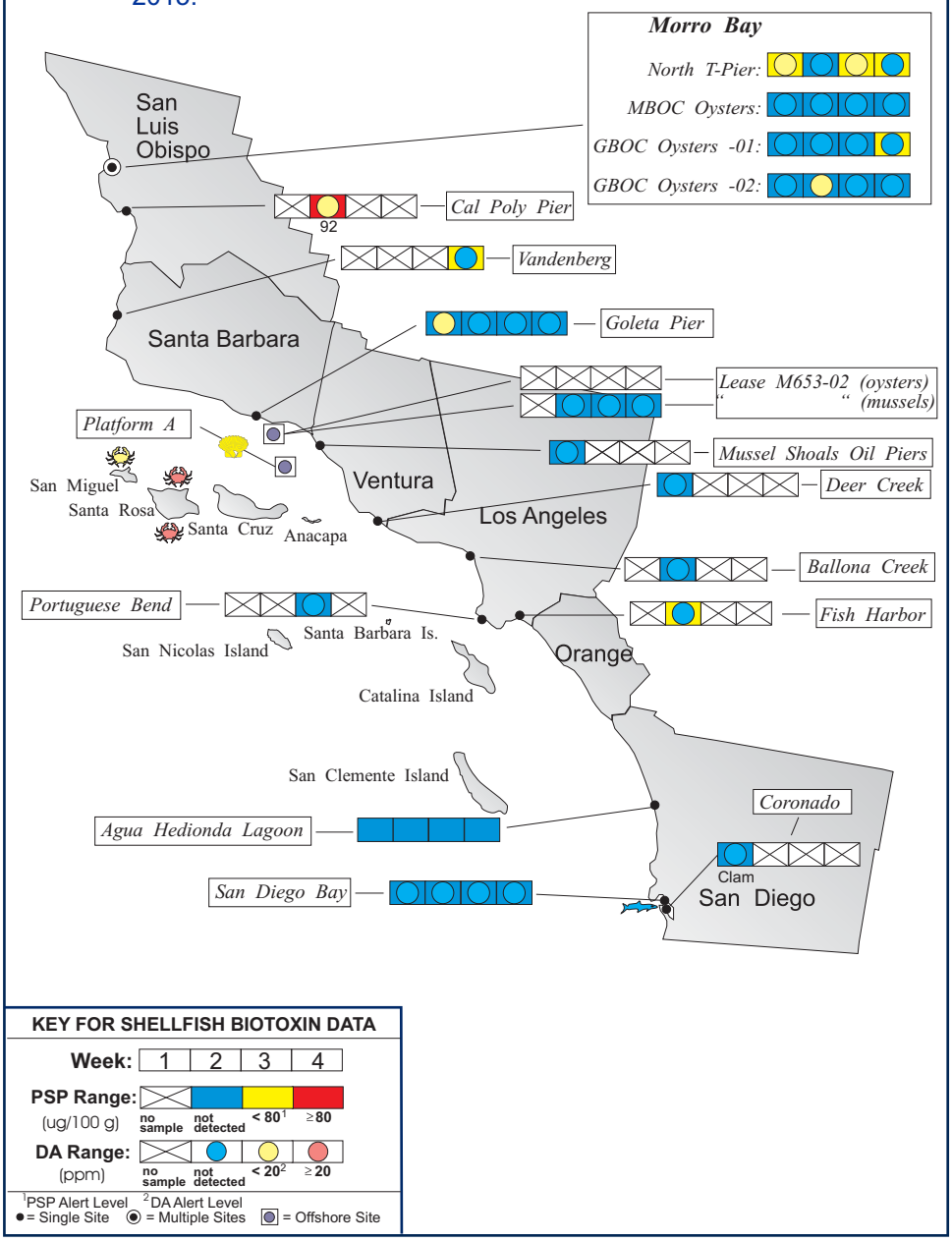
Figure 3. Distribution of shellfish biotoxins in Southern California during July, 2015.



in all southern California counties.

Northern California Summary:

Paralytic Shellfish Poisoning

Alexandrium was observed at four sampling sites between Sonoma and Santa Cruz counties (Figure 2). Cell numbers were low at all sites. Low levels of PSP toxins were detected in mussel samples collected at sites in Del Norte, Humboldt, Mendocino and Marin counties (Figure 4). A low concentration of PSP toxin was also detected in a razor clam sample from Doran Beach in Sonoma County, collected on July 4th.

Domoic Acid

Pseudo-nitzschia was observed at the majority of sampling sites in all Northern California counties (Figure 2). The percent composition of this diatom remained high at select sites between Sonoma and San Mateo counties and decreased in Santa Cruz County compared to June. The highest relative abundance and cell mass was observed at Hunter Rock in Del Norte County during the second and third weeks of the month. The cell mass was low at most locations. Domoic acid was detected from Del Norte to San Mateo counties (Figure 4). An elevated level of domoic acid (23 ppm) was detected in a sentinel mussel sample from Humboldt Bay USCG Pier on July 21. Low concentrations of domoic acid were detected in a razor clam sample from Doran

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The Marine Biotoxin Monitoring and Control Program, managed by the California Department of Public Health, is a state-wide effort involving a consortium of volunteer participants. The shellfish sampling and analysis element of this program is intended to provide an early warning of shellfish toxicity by routinely assessing coastal resources for the presence of paralytic shellfish poisoning (PSP) toxins and domoic acid.

The Phytoplankton Monitoring Program is a state-wide effort designed to detect toxin producing species of phytoplankton in ocean water before they impact the public. The phytoplankton monitoring and observation effort can provide an advanced warning of a potential toxic bloom, allowing us to focus sampling efforts in the affected area before California's valuable shellfish resources or the public health is threatened.

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(510) 412-4635

For Recorded Biotoxin Information Call:
(800) 553 - 4133

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Beach (Sonoma County). Crab samples were collected from Pillar Point Harbor at the beginning of July. The majority of crabs exceed the alert level in the viscera, with the highest at 160 ppm of domoic acid. Crab and sardine samples were collected by CDPH Food and Drug Branch from Santa Cruz on July 21. The crab and sardine samples contained low levels of domoic acid in the viscera.

Non-Toxic Species

The diatom *Chaetoceros* was common to abundant at sites in Sonoma, Marin and Monterey counties. The diatom *Skeletonema* was common to abundant in Humboldt County. The dinoflagellate *Prorocentrum micans* was common to abundant in Santa Cruz County.

QUARANTINES:

On June 1 the Department issued a Health Advisory warning consumers not to eat recreationally harvested mussels and clams, commercially or recreationally caught anchovy and sardines, or the internal organs of commercially or recreationally caught crab taken from Monterey and Santa Cruz counties. This advisory was issued because of elevated levels of domoic acid in samples from this region.

On June 8 the advisory was expanded to include the internal organs of scallops.

On July 3 the Health Advisory was expanded to include Santa Barbara County. The Health Advisory was also updated to include the meat of commercially or recreationally caught anchovy, sardines, and crabs taken from Monterey, Santa Cruz and Santa Barbara counties. As with the June 1 advisory, this action was taken due to the detection of high levels of domoic acid in samples from

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Figure 4. Distribution of shellfish biotoxins in Northern California during July, 2015.

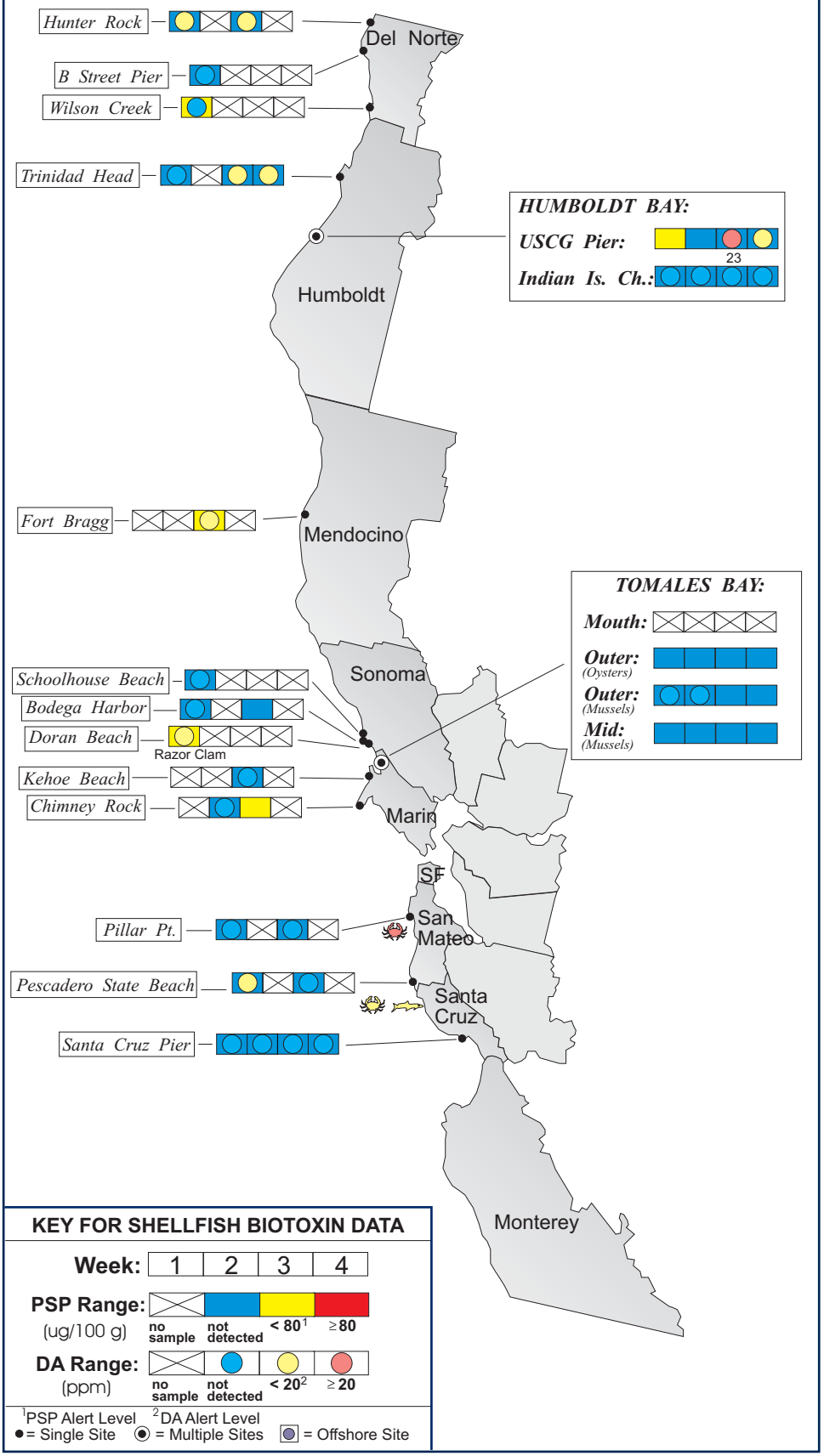

Table 1. Program participants collecting phytoplankton samples during July, 2015.

AGENCY	#	AGENCY	#
DEL NORTE COUNTY		Tolowa Dee-ni' Nation	2
HUMBOLDT COUNTY			
Coast Seafood Company	4	Humboldt State University Marine Lab	1
MENDOCINO COUNTY		CDPH Volunteer (*Marie DeSantis*)	3
SONOMA COUNTY			
CDPH Marine Biotoxin Program	3	Bodega Marine Lab & Farallone Institute	2
Gulf Farallones National Marine Sanctuary	4	Sonoma Coast Watch	1
MARIN COUNTY			
CDPH Marine Biotoxin Program	3	CDPH Volunteers (*Brent Anderson*)	3
Hog Island Oyster Company	4	Gulf Farallones National Marine Sanctuary	7
CONTRA COSTA COUNTY		CDPH Marine Biotoxin Program	1
SAN FRANCISCO COUNTY		Gulf Farallones National Marine Sanctuary	3
CDPH Volunteer (*Eugenia McNaughton*)	1	Exploratorium	5
SAN MATEO COUNTY		CDPH Marine Biotoxin Program	2
San Mateo County Environmental Health Dept.	6	The Marine Mammal Center (*Stan Jensen*)	4
Friends of the Sea Otter (*Diane Larson*)	2	U.C. Santa Cruz - Ano Nuevo	2
SANTA CRUZ COUNTY			
U.C. Santa Cruz	5	San Lorenzo Valley High School	1
Santa Cruz County Envir. Health Department	3	The Otter Project (*Jeff Palsgaard)*	4
MONTEREY COUNTY		Monterey Abalone Company	1
The Otter Project (*Rose, Noke)*	4	Marine Pollution Studies Laboratory	1
SAN LUIS OBISPO COUNTY			
Morro Bay National Estuary Program	3	Morro Bay Oyster Company	3
Coastal Discovery Center, San Simeon	3	Tenera Environmental	4
Friends of the Sea Otter (*Cherry, Plemons)*	8	CDPH Marine Biotoxin Program	2
SANTA BARBARA COUNTY			
CDPH Volunteer (*Sylvia Short*)	4	U.C. Santa Barbara	5
Santa Barbara Channel Keeper	2	Island Packers/HABNet	1
VENTURA COUNTY		Ventura County Envir. Health Department	1
National Park Service	2	CDPH Volunteer (*Fred Burgess*)	4
LOS ANGELES COUNTY		Los Angeles County Sanitation District	2
Long Beach Marine Institute	1	CDPH Volunteers (*Cal Parsons)*	1
Los Angeles County Health Department	4	Southern California Marine Institute	1
ORANGE COUNTY		CDPH Volunteer (*Truong Nguyen*)	2
California Department of Fish and Wildlife	4	Amigos de Bolsa Chica	5
SAN DIEGO COUNTY			
Scripps Institute of Oceanography	4	Carlsbad Aquafarms, Inc.	3
U.S. Navy Marine Mammal Program	5	Tijuana River National Estuary Research	5
Sea Camp/HABNet	1	CDPH Volunteer (*Cynthia Hall*)	2

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the region.

The annual mussel quarantine began on May 1. This annual quarantine prohibits the sport-harvesting of mussels along the entire California coastline, including all bays and estuaries.

Consumers of Washington clams, also known as butter clams (*Saxidomus nuttalli*), are cautioned to eat only the white meat. Washington clams can concentrate the PSP toxins in the viscera and in the dark parts of the siphon and can remain toxic for a long period of time. Persons taking scallops or clams, with the exception of razor clams, are advised to remove and discard the dark parts (i.e., the digestive organs or viscera). Razor clams (*Siliqua patula*) are an exception to this general guidance due to their ability to concentrate and retain domoic acid in the edible white meat as well as in the viscera.

PSP toxins can produce a tingling around the mouth and fingertips within a few minutes to a few hours after eating toxic shellfish. These symptoms can be followed by disturbed balance, lack of muscular coordination, slurred speech and difficulty swallowing. In severe poisonings, complete muscular paralysis and death from asphyxiation can occur.

Symptoms of domoic acid poisoning can occur within 30 minutes to 24 hours after eating toxic seafood. In mild cases, symptoms of exposure to this nerve toxin may include vomiting, diarrhea, abdominal cramps, headache and dizziness. These symptoms disappear completely within several days. In severe cases, the victim may experience excessive bronchial secretions, difficulty breathing, confusion, disorientation, cardiovascular instability, seizures, permanent loss of short-term memory, coma and death.

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Table 2. CDPH program participants submitting shellfish samples during July, 2015.

COUNTY	AGENCY	#
Del Norte	Yurok Tribe Environmental Program	1
	Tolowa Dee-ni' Nation	2
	CDPH Volunteer (*Harriet Jenesky*)	1
Humboldt	Coast Seafood Company	8
	Humboldt State University	2
	Humboldt County Environmental Health Department	1
Mendocino	Mendocino County Environmental Health Department	1
Sonoma	CDPH Marine Biotoxin Program	3
	CDPH Volunteer (*Charles Horn*)	1
Marin	Cove Mussel Company	4
	Hog Island Oyster Company	8
	CDPH Marine Biotoxin Program	3
San Francisco	None Submitted	
San Mateo	San Mateo County Environmental Health Department	4
	CDPH Volunteer (*Chris Eatinger*)	24
Santa Cruz	U.C. Santa Cruz	5
	CDPH Food and Drug Branch	10
Monterey	None Submitted	
San Luis Obispo	Grassy Bar Oyster Company	13
	Morro Bay Oyster Company	7
	CDPH Marine Biotoxin Program	1
Santa Barbara	Santa Barbara Mariculture Company	3
	U.C. Santa Barbara	6
	Vandenberg AFB	1
	CDPH Food and Drug Branch	6
Ventura	Ventura County Environmental Health Department	2
Los Angeles	Los Angeles County Health Department Sims	1
	Los Angeles County Health Department	1
	Southern California Marine Institute	1
Orange	None Submitted	
San Diego	Carlsbad Aquafarms, Inc.	4
	U.S. Navy Marine Mammal Program	5
	CDPH Volunteer (*Steve Crooke*)	1

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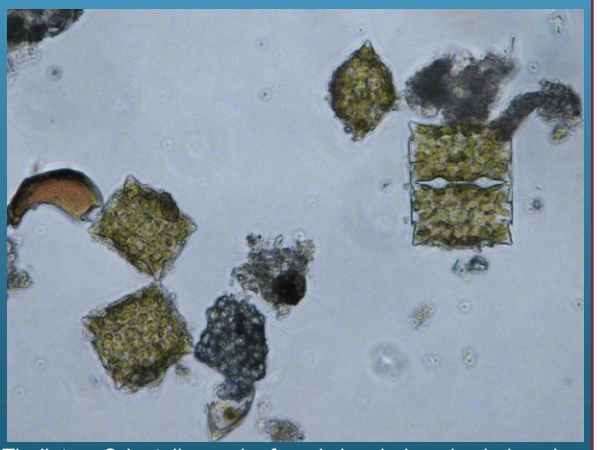
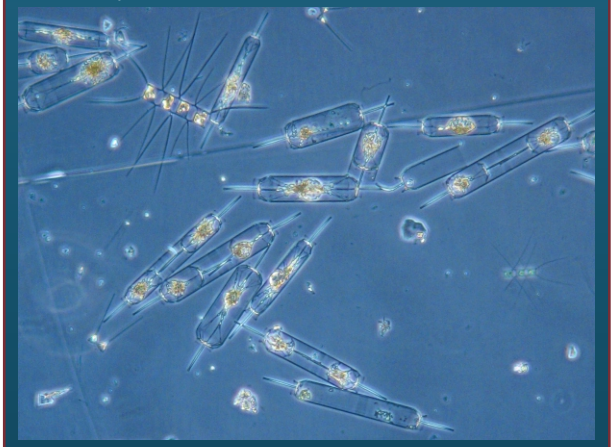
Any person experiencing any of these symptoms should seek immediate medical care. Consumers are also advised that neither cooking or freezing eliminates domoic acid or the PSP toxins from the shellfish tissue. These toxins may also accumulate in the viscera of seafood species such as crab, lobster, and small finfish like sardines and anchovies, therefore these tissues should not be consumed.

Contact the "Biotoxin Information Line" at 1-800-553-4133 for a current update on marine biotoxin activity prior to gathering and consuming shellfish.

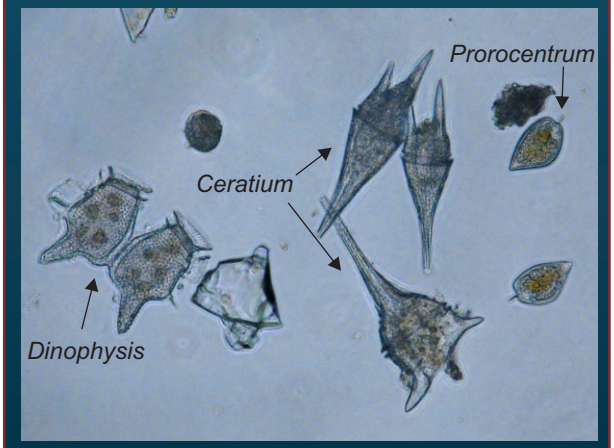
PHYTOPLANKTON GALLERY



Th diatom Odontella can be found singularly or in chains. In July it was found at Chimney Rock in Marin County. Here there are two chains of two cells each and a single cell seen from the top.



The singular diatom Ditylum was spotted in San Diego Bay in July.



A sample with a variety of dinoflagellates from offshore of Los Angeles County. There are multiple cells from the genera Dinophysis, Ceratium and Prorocentrum in this picture.